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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/330,418	06/11/1999	GARY N. TAYLOR	50261-2	9394

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EXAMINER
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LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 09/10/2003

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/330,418

Applicant(s)

TAYLOR ET AL.

Examiner

Sin J Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29,30 and 32-39 is/are rejected.
- 7) ☒ Claim(s) 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

### DETAILED ACTION

1. Applicants canceled claims 19-28.
2. It is to be noted that present claims 29-39 cannot be rejected over Shida et al'207 alone because the pendant acid-labile group of present claim 29 can no longer be an optionally substituted alkenyl group. Also, present claims 29-39 cannot be rejected over Goodall et al (WO'198) alone because the reference does not teach present polymer comprising polymerized acrylate groups of claim 29.

#### ***Claim Rejections - 35 USC § 103***

3. Claims 29, 30, 32-36, 38, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shida et al (6,060,207) in view of Goodall et al (WO 97/33198).

In Example II-148 to II-151, II-188 to II-191, Shida et al use a chemically amplified resist comprising a photoacid generator and a resin containing *isobornyl* methacrylate, menthyl methacrylate and methacrylic acid units. Also, in Examples II-156 to II-159, Shida teaches a chemically amplified resist comprising a photoacid generator and a resin containing *tetrahydropyranyl* methacrylate, menthyl methacrylate and methacrylic acid units. The *isobornyl group* in isobornyl methacrylate (an isobornyl ester) and the *tetrahydropyranyl group* in tetrahydropyranyl methacrylate (a tetrahydropyranyl ester) are *acid-decomposable functional groups* as taught by Shida et al in col.8, lines 40-50. In all of these Examples, Shida coats the resist solution onto a

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silicon wafer (*present microelectronic wafer*) before exposing it and then developing it to form a pattern.

Shida does not teach presently claimed pendant acid-labile group that contain an optionally substituted cycloalkyl group having 3 or 4 ring carbon atoms. However, Goodall et al teach (see claim 2) the equivalence of isobornyl group or tetrahydropyranyl group to dicyclopropylmethyl group and dimethylcyclopropylmethyl group (*both of which are substituted cycloalkyl group having 3 ring carbon atoms as presently claimed*) as protecting groups that are *acid-cleavable* by photoacid generators. Because the isobornyl group and tetrahydropyranyl group, both of which are taught be acid-decomposable functional groups by Shida et al, are art-recognized equivalents to the dicyclopropylmethyl group and dimethylcyclopropylmethyl group as acid-cleavable groups, it would have been obvious to one of ordinary skill in the art to replace isobornyl or tetrahydropyranyl group of Shida's resin with the dicyclopropylmethyl or dimethylcyclopropylmethyl group to make a resin containing *dicyclopropylmethyl (or dimethylcyclopropylmethyl) methacrylate*, menthyl methacrylate and methacrylic acid units in Shida's Examples. Therefore, Shida in view of Goodall would render obvious present invention of claims 29, 30, 36, 38, and 39. Also, the dicyclopropylmethyl (or dimethylcyclopropylmethyl) *methacrylate* unit in the resin containing dicyclopropylmethyl (or dimethylcyclopropylmethyl) methacrylate, menthyl methacrylate and methacrylic acid units, is the present alkyl ester group and the present alkyl acrylate group comprising an optionally substituted cycloalkyl group having 3 ring carbon atoms as presently claimed in claims 32-35.

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4. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shida et al (6,060,207) in view of Goodall et al (WO 97/33198) as applied to claim 29 above, and further in view of Watanabe et al (5,972,559).

Shida in view of Goodall does not explicitly teach present base component of claim 37. However, as evidenced by Watanabe, col.11, lines 22-31, it is very well known in the art to add a base component to a chemically amplified resist composition comprising a photoacid generator in order to suppress the diffusion rate at which the acid generated from the photoacid generator diffuses into a resist coating so as to improve resolution, exposure margin and pattern profile. Therefore, it would have been obvious to one of ordinary skill in the art to add a basic compound to Shida's chemically amplified resist composition in order to improve resolution, exposure margin and pattern profile as taught by Watanabe et al. Therefore, Shida in view of Goodall, and further in view of Watanabe et al would render obvious present invention of claim 37.

***Allowable Subject Matter***

5. Claim 31 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited prior arts either alone or in combination teaches or suggests the presently claimed pendant acid-labile group of claim 31 that contains an optionally substituted cycloalkyl group having 4 ring carbon atoms.

***R sponse to Arguments***

6. Applicants argue that combination of Shida and Goodall is not proper because the two documents address different polymer systems. Therefore, applicants argue that persons skilled in the art would not be motivated to combine features of those two polymers as proposed by present rejection. However, applicants' such arguments are found to be unpersuasive. Although it is true that Shida and Goodall do not use the same polymer systems, both of those polymers used in these references contain pendant acid labile groups. Also, both of these references teach a positive working photoresist composition containing a photoacid generator. As explained above, Shida clearly teaches isobornyl group and tetrahydropyranyl group to be *acid-decomposable functional groups*, and Goodall et al teach the equivalence of those groups to dicyclopropylmethyl group and dimethylcyclopropylmethyl group as *acid-cleavable* groups. Because the isobornyl group and tetrahydropyranyl group are art-recognized equivalents to the dicyclopropylmethyl group and dimethylcyclopropylmethyl group as acid-cleavable groups, it is still the Examiner's position that it would have been obvious to one of ordinary skill in the art to replace isobornyl or tetrahydropyranyl group of Shida's resin with the dicyclopropylmethyl or dimethylcyclopropylmethyl group to make a resin containing *dicyclopropylmethyl (or dimethylcyclopropylmethyl)* methacrylate, menthyl methacrylate and methacrylic acid units in Shida's Examples with a reasonable expectation that dicyclopropylmethyl or dimethylcyclopropylmethyl group would function in the same way as those acid decomposable groups (i.e., isobornyl group and tetrahydropyranyl group ) in Shida's resin.

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For the reasons stated above, present rejections still stand.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

*S. J. Lee*

S. Lee  
9/6/03

*Rosemary Ashton*

ROSEMARY ASHTON  
PRIMARY EXAMINER